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OSTRACODS OF THE FAMILY HOLLINIDAE
FROM THE FERRON POINT
FORMATION OF MICHIGAN

BY
ROBERT V. KESLING



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OSTRACODS OF THE FAMILY HOLLINIDAE FROM THE FERRON POINT FORMATION OF MICHIGAN

By
ROBERT V. KESLING

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INTRODUCTION

THE ostracods described in this paper are from the Ferron Point formation of the Middle Devonian Traverse group of Michigan. They include nine new species of the family Hollinidae. These ostracods are highly and distinctively ornamented, and many show the dimorphism characteristic of their respective genera.

The ostracod fauna of this formation is distinct from that of the underlying Rockport Quarry limestone and from that of the overlying Genshaw formation. Its closest affinities are with the fauna of the Bell shale, which underlies the Rockport Quarry limestone.

Although no papers have been written exclusively on the ostracods of the Ferron Point formation, Warthin (1934) used samples from the Ferron Point, which was then included in the Long Lake series, in his article on the ostracods of the Traverse group.

Some specimens used for this study are from samples of the Ferron Point formation collected and prepared in 1933 by Dr. A. S. Warthin, now of the Geology Department, Vassar College. The author is very grateful for these carefully labeled samples. Additional material can no longer be obtained with stratigraphic accuracy from some of Dr. Warthin's localities, because they are grossly contaminated by slumping of the overlying strata.

The author appreciates the helpful criticism of Dr. L. B. Kellum, Dr. C. A. Arnold, and Dr. G. M. Ehlers concerning the organization of this paper.

All types are catalogued and deposited in the Museum of Paleontology of the University of Michigan.

REGISTER OF LOCALITIES

The ostracods described in this paper were collected from the following localities of Ferron Point formation exposures:

LOCALITY

1. Abandoned quarry of Kelley's Island Lime and Transport Company at Rockport, Alpena County, sec. 6, T. 32 N., R. 9 E.; locality 38 of the Michigan Geological Survey. Hollinid ostracods were found only in the samples of the 6-inch bed of gray calcareous shale (Bed 13 of Warthin and Cooper, 1943, p. 581) at the top of the quarry wall about one-half mile west of the crusher. Collected by Robert V. Kesling in 1949.
2. Abandoned quarry of Onaway Limestone Company on the shore of Black Lake, Presque Isle County, NW. $\frac{1}{4}$ sec. 7, T. 35 N., R. 2 E.; locality 29 of the Michigan Geological Survey. Collected by George M. Ehlers and Robert V. Kesling in 1950.
3. Abandoned shale pit of Alpena Portland Cement Company, about eight miles northeast of Alpena, Alpena County, S.E. $\frac{1}{4}$ sec. 18, T. 32 N., R. 9 E.; locality 51 of the Michigan Geological Survey. Channel sample of the 19 feet of shale collected by George M. Ehlers, Erwin C. Stumm, and Robert V. Kesling in 1949.
 - 3a. Chonetes beds, 3 feet above the water level in the pit as it stood on July 5, 1933. Collected by A. S. Warthin.
 - 3b. Chonetes beds, $4\frac{1}{2}$ feet above 3a. Collected by A. S. Warthin in 1933.
 - 3c. Greenish shale, about 2 feet above 3b. Collected by A. S. Warthin in 1933.
 - 3d. Shale about 5 feet above 3c. Collected by A. S. Warthin in 1933.
 - 3e. Shale about 5 feet above 3d. Collected by A. S. Warthin in 1933.

SYSTEMATIC DESCRIPTIONS

Phylum ARTHROPODA

Class CRUSTACEA

Order OSTRACODA

Superfamily Beyrichiacea

Family Hollinidae

Genus *Ctenoloculina* Bassler 1941*Ctenoloculina eurybathrota*, sp. nov.

(Pl. I, Figs. 1-9)

Description of female.—Carapace subelliptical in lateral view, subcuneate in dorsal view, and subquadrate in end view. Hinge line straight. Anterior border subround, ventral border gently curved, and posterior border subround, slightly acuminate in the dorsal part. Distinctly quadri-lobate. Lobes with flat surfaces. L1 parallel to anterior border, ventrally confluent with the frill; L2 elongate, its sides nearly parallel, terminating above the frill; L3 elongate, panduriform, widest in the ventral part, also

terminating above the frill; and L4 unequally subquadrate, its anterior border nearly vertical, its posteroventral border parallel to the free border, its posterodorsal border short and slanting upward and forward, and its dorsal border parallel to the hinge line. L1 and L3 extending slightly above the hinge line. Sulci smooth, with curved bottom. S1, S2, and S3 all confluent below lobes.

Frill large, extending behind L3, its ventral border below the free edge of the contact margin. Six loculi in each valve, all with round openings. Ventral surface sloping upward and inward from the edge of the frill to the small marginal ridge.

Anterior cardinal angle approximately 120 degrees; posterior cardinal angle about 100 degrees.

Lobes and lateral surface of frill ornamented with small round papillae. L1 and lateral surface of frill bordered in common by a small smooth ridge. L2, L3, and L4 also bordered by small smooth ridges.

Dimensions of paratype No. 28027, a complete female carapace: length, 1.11 mm.; height, 0.59 mm.; and width, 0.53 mm.

Description of male.—General outline, lobation, and ornamentation same as those of female. Carapace subtriangular in end view. L1 terminating ventrally in a pointed tip. L2 and L3 with slight constrictions near their lower ends. L2 and L3 extending below free edge, their ventral ends flat, with short posteriorly directed spurs. Small smooth ridges completely bordering all lobes.

Dimensions of paratype No. 28028, a complete male carapace: length, 0.88 mm.; height, 0.50 mm.; and width, 0.49 mm.

Remarks.—This distinctive little species is represented by numerous specimens. *Ctenoloculina eurybathrota* is distinguished from *C. myurilobota*, sp. nov., with which it occurs, by its smaller size and wider lobes. In addition, the females of *C. eurybathrota* differ from those of *C. myurilobota* in having L2 and L3 terminating above the frill, complete bordering ridges around L2 and L3, and a small complete ridge bordering L1 and the lateral surface of the frill in common. Furthermore, males of *C. eurybathrota* differ from those of *C. myurilobota* in having constrictions in the lower parts of L2 and L3, flatter ventral ends on L2 and L3, proportionally wider ventral surface, and the spurs flared outward as seen in end view.

The name of this species is derived from Greek εὐρύς ("broad") and βαθρόν ("base") and refers to the large width across the ventral part of the carapace.

Occurrence.—Localities 3, 3b, 3c, 3d, and 3e.

Types.—Holotype, a female right valve, No. 28025; allotype, a male

carapace, No. 28026; paratypes, a female carapace, No. 28027, and a male carapace, No. 28028.

Ctenoloculina myurilobota, sp. nov.

(Pl. I, Figs. 10-15)

Description of female.—General outline, lobation, ornamentation, and loculi same as those of *C. cicatricosa* (Warthin). L1, L2, and L3 narrow, extending onto frill.

Small papillae ornamenting each of the flat lobes. Small smooth ridges bordering the lobes, ventrally incomplete in L1, L2, and L3.

Dimensions of holotype, a female carapace: length, 1.29 mm.; height, 0.70 mm.; and width, 0.68 mm.

Description of male.—General outline, lobation, ornamentation and spurs like those of *C. cicatricosa* (Warthin). L1, L2, and L3 narrow.

Remarks.—This species, represented by numerous specimens, differs from *C. cicatricosa* (Warthin), from the type locality in the Norway Point formation, in having narrower lobes and wider sulci. The ventral part of L3 in particular is narrower.

The name of this species is derived from Greek *μυοῦρος* ("compressed, narrow") and *λοβος*, m. ("lobe") and refers to the narrow L2 and L3.

Occurrence.—Localities 3, 3b, and 3c.

Types.—Holotype, a female carapace, No. 28029; allotype, a male carapace, No. 28030; paratype, a female right valve, No. 28031.

Genus *Hollinella* Coryell 1928

Hollinella pumila, sp. nov.

(Pl. I, Figs. 16-23)

Description of female.—Carapace subelliptical in lateral view, sub lanceolate in dorsal view, and elongate subquadrate in end view. Hinge line straight. Anterior border subround, ventral and posteroventral borders gently curved, the posterodorsal border subround. L1 gently arched, confluent with ventral lobe. L2 vertically elongate, anteroventrally confluent with ventral lobe. L3 large, bulblike, extending above the hinge line, slightly compressed laterally. L4 confluent with ventral lobe. S2 deep, extending from dorsal border to middle of valve, its ventral half directed slightly forward.

Anterior and posterior cardinal angles approximately 120 and 110 degrees, respectively.

Lateral and ventral surfaces ornamented with small low papillae and a few scattered larger papillae. Frill very narrow, small, smooth, extending

from dorsal part of anterior border to posteroventral border. As seen in ventral view, frills of the two valves farthest apart at their posterior ends and closest in their anteroventral parts. Distinct, closely spaced, small marginal tubercles.

Dimensions of allotype, a female carapace: length, 0.95 mm.; height, 0.57 mm.; and width, 0.41 mm.

Description of male.—General shape, lobation, and ornamentation like those of female. Frills of the two valves nearly parallel as seen in ventral view. Each frill distinct in the anterior and anteroventral parts, tapering to a low ridge in the ventral part, and ending in a large spurlike protuberance. Frill higher on valve than that of female, with marginal tubercles visible below frill.

Dimensions of holotype, a male carapace: length, 1.00 mm.; height, 0.59 mm.; and width, 0.48 mm.

Remarks.—The dimorph chosen as the female has the frills closest together in the anteroventral part, but contrary to the dimorphism exhibited by most other *Hollinella* species of the Middle Devonian, the female of *H. pumila* has a narrower carapace than that of the male.

H. pumila closely resembles *H. productilobata* Kesling and McMillan from the Bell shale, but differs from it in having less distinct ornamentation, the frill of the female extending below the ventral part of the free edge, a slightly smaller L3, and an apex at the posterior corner.

The name of this species is derived from Latin *pumilus* ("dwarfish") and refers to the small size of the carapace.

Occurrence.—Localities 1, 2, 3, 3b, and 3c.

Types.—Holotype, a male carapace, No. 28032; allotype, a female carapace, No. 28033; paratypes, a male carapace, No. 28034, and a female carapace, No. 28035.

Genus *Hollina* Ulrich and Bassler 1908

***Hollina pyxidata*, sp. nov.**

(Pl. I, Figs. 24–31)

Description of female.—Female known only from incomplete valves. Valves subpyriform in lateral view. Hinge line straight. Anterodorsal border nearly straight, border indented where the incurved frill joins the rest of the valve, anteroventral and ventral borders subround, posteroventral border gently curved, and posterodorsal border sharply curved. L1 large, elongate, knoblike, anteroventrally confluent with frill; L2 a small node, L3 a large bulb, and L4 not known. L1 and L3 extending above the hinge line. Two elongate ventral lobes, both confluent with the frill, the anterior

one smaller and located anteroventral to L2, the posterior one sloping at an angle of about 45 degrees from below L3 to its junction with the posterior part of the frill. S1 deep, extending from dorsal border to frill, curved around ventral end of L1; S2 deep, dorsally confluent with S1, extending from dorsal border to frill, passing between L3 and L2 and between the two ventral lobes; and S3 nearly vertical, well defined, from the dorsal to the posteroventral border.

Anterior cardinal angle about 110 degrees.

Frill large, strongly incurved around its entire border, its distal edge reaching to the plane of the contact margin. In a complete carapace, the frills of the two valves would together form an extraneous chamber.

Entire surface covered with closely spaced papillae, those on the lobes larger than those on the sulci. Ventral and posteroventral parts of the free edge bordered by distinct marginal tubercles.

Height of allotype, an incomplete female right valve, 0.84 mm.

Description of male.—Carapace boxlike, subpyriform in lateral view, subquadrate in dorsal and in end views. L1 large, elongate, knoblike, parallel to the anterodorsal border, terminating near the middle of the anterior part of the valve. L2 and L3 like those of the female, L4 large, vertically elongate, knoblike. All sulci reaching the ventral border. Two ventral lobes large, terminating in low, bluntly rounded projections: the anterior one nodelike; the posterior one elongate, knoblike. Marginal tubercles around entire free edge, those of the anterodorsal and postero-dorsal parts distinctly smaller.

Dimensions of holotype, a complete male carapace: length, 1.18 mm.; height, 0.74 mm.; and width, 0.68 mm.

Remarks.—This is the youngest species of *Hollina* described. It strongly resembles the genotype, *H. insolens* (Ulrich), from which it differs in details of lobation. In *H. pyxidata*, L2 is distinctly separated from the anterior ventral lobe and from L1, but in *H. insolens*, L2 is ventrally separated from the anterior ventral lobe and anteroventrally separated from L1 by only low, saddlelike depressions. The females particularly differ in this respect. The male of *H. pyxidata* also has smaller protuberances on the ventral lobes, particularly the anterior one, than the male of *H. insolens*.

The name of this species is derived from the Latin *pyxidatus* ("box-like") and refers to the shape of the carapace.

Occurrence.—Localities 3, 3a, 3b, and 3c.

Types.—Holotype, a male carapace, No. 28036; allotype, a broken female right valve, No. 28037; paratypes, a broken female left valve, No. 28038, and a broken male right valve, No. 28039.

Genus *Falsipollex* Kesling and McMillan 1951

Falsipollex laxivelatus, sp. nov.

(Pl. II, Figs. 1-9)

Description of female.—Carapace subpyriform in lateral view, elongate subquadrate in dorsal and in end views. Hinge line straight. Anterior and anteroventral borders subround, ventral border straight, posteroventral border straight, posterodorsal border sharply curved. L1 low, confluent with frill; L2 a small node, ventrally confluent with rest of valve; L3 a distinct bulb; L4 a vertically elongate lobe, not sharply set off. L3 and dorsal end of the large frill extending above the hinge line. S1 a short, shallow groove; S2 deeper, well defined from dorsal border to middle of valve, continuing to frill as a shallow depression; and S3 a slight depression.

Frill wide, incurved, extending from anterior corner to posteroventral part of valve; frills of two valves farthest apart at their ends, nearest in their anteroventral parts. Frill joined to rest of valve along a very shallow depression.

Surface of valve and frill ornamented by small low papillae of varying heights, indistinct in some specimens.

Dimensions of holotype, a female carapace: length, 1.32 mm.; height, 0.96 mm.; and width (measured through L3's), 0.66 mm.

Description of male.—General shape, lobation, and ornamentation like those of female. Carapace subrectangular in anterior view. Ventral part of S2 shallow, curved somewhat forward. Velate structures consisting of two smooth spurs on each valve, one low and blunt on the anteroventral part of the valve, the other long, spinelike, slightly tapering, on the posteroventral part. Marginal tubercles on the free edge of both valves. As seen in anterior view, the posterior spurs directed slightly outward.

Dimensions of allotype, a male carapace: length, 1.11 mm.; height, 0.73 mm.; and width (measured through L3's), 0.64 mm.

Remarks.—This species differs from the genotype, *Falsipollex altituberculatus* Kesling and McMillan, in having smaller and lower papillae on the surface, larger height/length ratio, and smooth uncurved spurs in the male.

The name of this species is derived from Latin *laxus* ("wide") and *velum*, n. ("a curtain") and refers to the wide frill.

Occurrence.—Locality 3.

Types.—Holotype, a female carapace, No. 28040; allotype, a male carapace, No. 28041; paratypes, a male carapace, No. 28042, and a female carapace, No. 28043.

Falsipollex valgus, sp. nov.

(Pl. II, Figs. 19-26)

Description of female.—Valve subpyriform in lateral view. Hinge line straight. Anterior and anteroventral borders subround, posteroventral border nearly straight, and posterodorsal border subround. L1 confluent with large frill, sloping gently into rest of valve; L2 a very small vertically elongate node, anteroventrally confluent with rest of valve; L3 a large bulb, extending above the hinge line; and L4 a vertically elongate, ridge-like lobe parallel to the posterior border. S1 a short groove; S2 deep, dorsally confluent with S1, curving slightly forward and down to the middle of the valve; and S3 only a slight depression.

Frill wide, strongly incurved, from the anterior corner to the middle of the ventral border, joined to the rest of the valve along a gentle depression. A distinct, round, spurlike protuberance on the posteroventral part of the valve.

Anterior and posterior cardinal angles about 115 and 105 degrees, respectively.

Surface of valve, including frill, ornamented by distinct papillae, all of the same height. Spurlike protuberance smooth.

Dimensions of holotype, a female left valve: length, 1.34 mm.; height, 0.92 mm.

Description of male.—General shape, lobation, and ornamentation same as those of the female. Two wide flat spurs on each valve, one larger and slightly curved backward on the anteroventral part of the valve, the other nearly rectangular as seen in lateral view on the posteroventral part. Ends of spurs smooth, the bases ornamented with small papillae. As seen in ventral view, the anterior spur is sharply flared outward. Distinct marginal tubercles along entire free edge of each valve.

Dimensions of allotype, a male carapace: length, 1.11 mm.; height, 0.73 mm., and width, 0.61 mm.

Remarks.—This beautiful species differs from *Falsipollex altituberculatus* Kesling and McMillan and from *F. laxivelatus*, sp. nov., in having more distinct and regular papillae, in being flatter with flaring anterior spurs in the male, and in having very unusual velate structures in the female.

The name of this species is derived from Latin *valgus* ("bowlegged") and refers to the outward curvature of the spurs of the male.

Occurrence.—Localities 3, 3a, and 3c.

Types.—Holotype, a female left valve, No. 28049; allotype, a male carapace, No. 28050; paratype, a male carapace, No. 28051.

***Falsipollex parvilobatus*, sp. nov.**

(Pl. II, Figs. 10–13)

Description of male.—Carapace subelliptical to subpyriform in lateral view, sublanceolate with constriction near the middle in ventral view, and sublanceolate in end view. Hinge line straight. Anterior and anteroventral borders subround, posteroventral border gently curved, and posterodorsal border subround. Posterior border and dorsal border meeting at a distinct apex. L1 a low lobe ventrally confluent with ventral lobe; L2 a small vertically elongate node, anteroventrally confluent with ventral lobe; L3 a small circular knob, nearly tangent to the dorsal border; and L4 a low lobe confluent with the ventral lobe. S1 a shallow groove; the dorsal one-third of S2 deep, the middle one-third a shallow sulcus sloping below the posteroventral part of L2 and meeting the dorsal one-third in a geniculum, and the ventral one-third a shallow depression reaching the ventral border; and S3 a short shallow groove.

Anterior and posterior cardinal angles about 115 and 90 degrees, respectively.

Two smooth, well-developed spurs on each valve, each oval in cross-section, both directed outward and down, one on anteroventral part of valve and the other on the posteroventral part.

Small, closely spaced, discrete papillae on entire surface except spurs. Small, closely spaced marginal papillae on the entire free edge of each valve.

Dimensions of holotype, a carapace: length, 1.18 mm.; height, 0.71 mm.; and width, 0.45 mm.

Remarks.—No females of *Falsipollex parvilobatus* have been found. The spurs and sulcation of the specimens are very much like those in *Parabolbina*, but this species is assigned to *Falsipollex* because of the shape of L3. No species of *Parabolbina* are known to have a knoblike L3, however, although some species of that genus have an inflated L3. This species differs from other species of *Falsipollex* in having a small L3, a small posterior cardinal angle, and the unusual marginal ornamentation.

The name of this species is derived from Latin *parvus* ("small") and *lobatus* ("lobed") and refers to the shape of L3.

Occurrence.—Locality 3.

Types.—Holotype, a male carapace, No. 28044; paratype, an immature carapace, No. 28045.

Genus *Subligaculum* Kesling and McMillan 1951

***Subligaculum tribursatum*, sp. nov.**

(Pl. II, Figs. 14-15)

Description of female.—Valve small. Dorsal border straight, anterodorsal border subround, anteroventral border subquadrate around the large frill, posteroventral and posterior borders evenly curved. S2 deep and narrow, extending from dorsal border to middle of valve, with long postero-dorsal and anteroventral extensions from its lower end.

Wide, short, incurved frill on the anteroventral part of valve, with three distinct scallops on the lateral surface and three cuplike depressions on the interior surface. A small smooth tubercle on the posteroventral part of valve.

Surface ornamented by a reticulation formed by very small ridges between adjacent small punctae.

Remarks.—No male of this species has been found. This species differs from other species of *Subligaculum* in having only three scallops in the frill, a very short frill, and the small smooth tubercle on the posteroventral part of the valve.

The name of this species is derived from Latin *tres* ("three") and *bursa*, f. ("pouch") and refers to the shape of the frill.

Occurrence.—Locality 3.

Types.—Holotype, a female right valve, No. 28046.

***Subligaculum lacinosum*, sp. nov.**

(Pl. II, Figs. 16-18)

Description of female.—Carapace small. Subovate in lateral view, elongate subelliptical in ventral view, and elongate subquadrate in end view. Dorsal border straight; anterodorsal border gently curved; anteroventral and ventral borders with four subround indentations, marking the positions of the four halves of the "little chambers"; and posteroventral and posterior borders subround. S2 narrow but deep, from the dorsal border nearly to the middle of the valve, with short anterior and posterior extensions from its lower end.

Frill narrow, fluted as seen in lateral view, with a very small ridge around its outer border. Each flute marking the position of one of the four halves of the "little chambers"; in a complete carapace these "little chambers" open on their ventral sides. As seen in ventral view, the narrow frill scalloped, the ends of each scallop projecting in a sharp tip.

Surface ornamented with small, closely spaced papillae.

Remarks.—No males of this unusual little species have been found. The female differs from those of other species of *Subligaculum* in the unusual form of the narrow, fluted, and scalloped frill.

The name of this species is derived from Latin *laciniosus* ("full of points, indented") and refers to the shape of the frill.

Occurrence.—Locality 3.

Types.—Holotype, a female carapace, No. 28047; paratype, another female carapace, No. 28048.

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Submitted for publication January 23, 1952

EXPLANATION OF PLATE I

(All figures $\times 28$)

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PLATE I

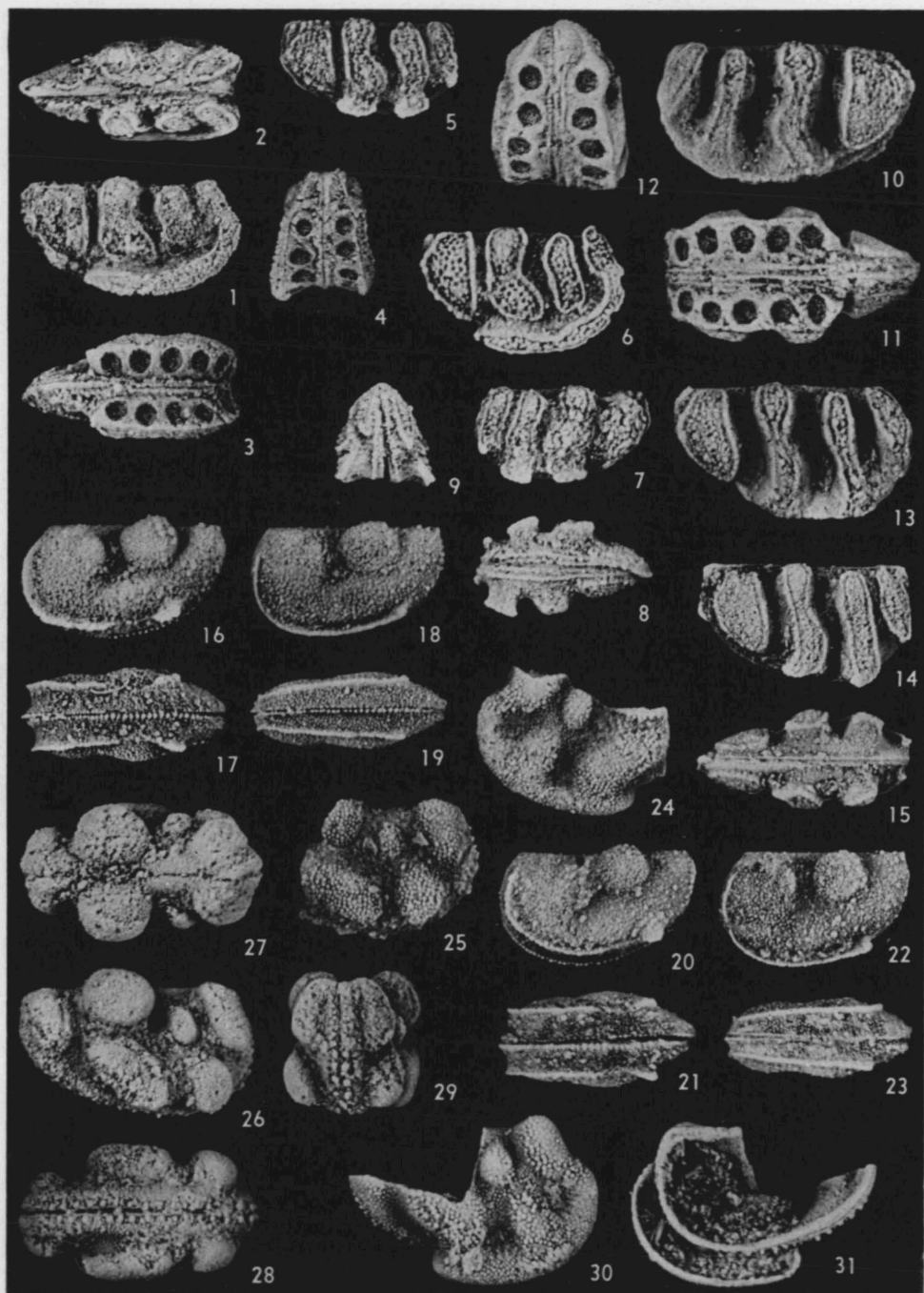
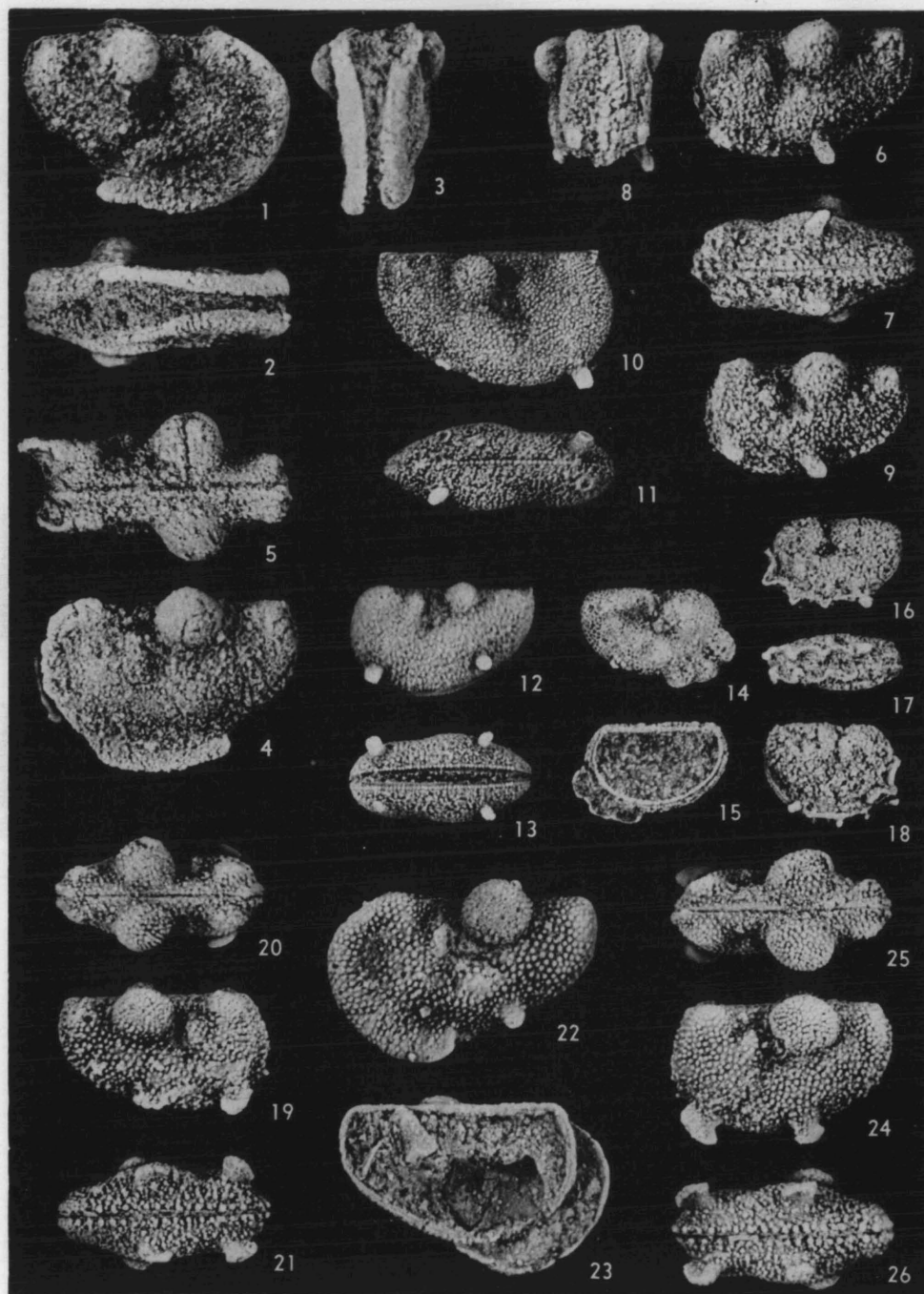


PLATE II



EXPLANATION OF PLATE II

(All figures $\times 28$)

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 FIG. 9. Left lateral view of male carapace. Paratype No. 28042.
- Falsipollex parvilobatus*, sp. nov. 53
 FIGS. 10-11. Right lateral and ventral views of male carapace. Holotype No. 28044.
 FIGS. 12-13. Left lateral and ventral views of immature male carapace. Paratype No. 28045.
- Subligaculum tribursatum*, sp. nov. 54
 FIGS. 14-15. Lateral and interior views of female right valve. Holotype No. 28046.
- Subligaculum laciniosum*, sp. nov. 54
 FIGS. 16-17. Left lateral and ventral views of female carapace. Holotype No. 28047.
 FIG. 18. Right lateral view of female carapace. Paratype No. 28048.
- Falsipollex valgis*, sp. nov. 52
 FIGS. 19-21. Right lateral, dorsal, and ventral views of male carapace. Paratype No. 28051.
 FIGS. 22-23. Lateral and interior views of female left valve. Holotype No. 28049.
 FIGS. 24-26. Left lateral, dorsal, and ventral views of male carapace. Allotype No. 28050.

VOLUME X

1. Ostracods of the Families Leperditellidae, Drepanellidae, Glyptopleuridae, Kloedenellidae, Bairdiidae, Barychilinidae, and Thlip-suridae from the Genshaw Formation of Michigan, by Robert V. Kesling and John E. Kilgore. Pages 1-19, with 4 plates. Price \$.60.
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3. Ostracods of the Family Hollinidae from the Ferron Point Formation of Michigan, by Robert V. Kesling. Pages 45-57, with 2 plates. Price \$.50.

